

## Humanity and evolution

Charles Darwin's thinking about the natural world was profoundly influenced by his revulsion for slavery.

**A**lthough history is not made entirely, or even mostly, by prominent men and women, two great exceptions to that rule were born exactly 200 years ago today, on 12 February 1809: Charles Darwin and Abraham Lincoln.

These men shared more than just a birthday, the loss of a mother in childhood and a date with immortality. They shared a position on one of the great issues of their age: the 'peculiar and powerful interest' of their fellow humans bound in slavery. When he circled the world in the 1830s, Darwin's delight at our planet's natural riches was repeatedly poisoned by the cruelties he saw meted out to slaves. "I thank God, I shall never again visit a slave-country," he wrote at the end of the *Voyage of the Beagle*.

A new historical study, *Darwin's Sacred Cause* by Adrian Desmond and James Moore (see page 792), seeks to unite Darwin's revulsion at slavery with his scientific work. It was common at the time to believe that the different races of men had been created separate and unequal. But the abolitionist beliefs that Darwin derived from his family, friends and social setting strongly disposed him to the idea that all men — Englishman and Hottentot, freeman and slave — were brothers united in shared ancestry. The ability to see that unity-in-variety was, Desmond and Moore argue, one of the things that allowed him to perceive something similar in the natural world as a whole. As Darwin wrote in an 1838 notebook, "I cannot help thinking good analogy might be traced between relationship of all men now living & the classification of animals." When Darwin sketched life's common descent as a family tree, it was because he believed in a family tree for humans — a belief in common kinship that was not a disinterested scientific finding, but rather an expression of moral and political persuasion. Darwin's thought always extended beyond the natural world. His ideas always had, and were meant to have, a social dimension.

### Lessons from history

For all Darwin's noble ambitions, the century and a half since *On the Origin of Species* have shown how easily his image of a fiercely competitive world can be used to bolster pre-existing positions of power and privilege with buttresses of support that seem founded in an impartial consideration of the natural world. The history of arguments about humanity based on biology — both Darwin's biology and that of others who have come after — provides a sorry rehearsal of pretexts and apologies for everything from unthinking prejudice to forced sterilization and genocide (see page 786).

This history counsels caution as ever deeper and subtler forays into the science of human nature become possible. Deciphering the traces of natural selection in the human genome (see page 776), and dissecting the genetics of neurobiology and behaviour promise a new, more detailed and complex sense of how of how evolution has given human nature a definite biological form — while at the same time throwing new light on just how deeply biology can be influenced by society and culture. This is a rich field for research in both the natural and the social sciences, especially in the form of new collaborations between them (see page 780).

It is vital, however, that this new knowledge should be judged by far higher standards than the ideology passed off as biology that blighted so much of the twentieth century. Scientists have beliefs about what is right and wrong, just like everyone else. And try as they may to put them to one side — some try hard, some not so much — those beliefs will influence the way they do science, and the questions they ask and fail to ask. The scientific enterprise as a whole has to pay particular heed to the risk that preconceptions will creep in whenever what is being said about human nature has political or social implications.

This is particularly the case when science begins to look, as moral psychology is doing, at

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the mechanisms by which people make decisions about right or wrong. Here it becomes peculiarly hard — and at the same time especially important — to resist the ‘naturalistic fallacy’ of inferring what ought to be from what is. Science may be able to tell us why some values are more easily held than others. But it cannot tell us whether taking the easy path in terms of which values we espouse is the right thing to do.

In fact, it provides us with a worked example to the contrary. The scientific endeavour itself is founded on values which natural selection would have seemed unlikely to foist on a bunch of violent, gregarious upright apes. Science tries to place no trust in authority; to some extent, society has to. Science tries to define its membership on the basis of inclusion, rather than exclusion; work on altruism suggests, worryingly, that communities more normally need an outgroup to form against. Science insists on the value of truth even when it is inconvenient or harmful; most people’s beliefs tend to reinforce their self-interest.

In this unnaturalness lies the great strength of science. It is from this it derives its power as a way of understanding the world. And this is also what allows it, at its best, to resist, not reinforce, mores and prejudices that pose as truths of nature. This demanding, artificial code is what gives engaged, passionate and all-too-fallible human beings the collective power to produce results that are dispassionate, objective and reliable. And if science stays true to that code, it can act as a stern restraint on anyone seeking to go from the study of how people evolved to conclusions about how they should be treated now — to go, that is, against the values that both Darwin and Lincoln espoused.

Science can never prove humans alike in dignity, or equally deserving under the law; that is a truth that cannot be discovered. Like the ideals of malice towards none and charity towards all, it is something that must be made real through communal will. ■

## Natural value

The economic downturn might be the best time to include ecosystem services in the real economy.

Worldwide momentum seems to be growing for an approach to environmental protection based on the ‘ecosystem services’ that nature provides for humans. These can range from watersheds filtering drinking water and forests sequestering carbon, to marshes dissipating the fury of storms. As long as the marketplace treats such services as free goods, proponents argue, the value of what nature does for humanity will effectively be set to zero and nature will continue to be trashed. But if the market could somehow be made to price the services appropriately, all those forests, streams, lakes, prairies and seashores would suddenly acquire real economic value, and people would have incentives to preserve them.

The ecosystem services approach clearly has great potential. Indeed, it is a natural extension of the market-based carbon tax or cap-and-trade approaches now being implemented to curb carbon emissions, in that it tackles environmental externalities historically ignored by the global economy. This month, moreover, a special issue of the Ecological Society of America’s journal *Frontiers in Ecology and the Environment* offers some badly needed hard science on the subject. In one paper, for example, computer modelling of land use in the Willamette Basin in Oregon shows that commercial development ceases to be the most rational use of land when the simulation incorporates even conservatively priced payments for the carbon sequestration the land provides.

This special issue is just one of several recent developments that seem to herald ecosystem services’ entry into mainstream scientific and political thinking. The Economics of Ecosystems and Biodiversity project funded by the European Union is collecting scientific evidence on the “economic consequences of biodiversity loss” until 31 March. The goal is to assemble a toolkit of techniques and information for those who want to do empirical ecosystem valuations of their own.

Elsewhere, last December the US Congress created an Office of

Ecosystem Services and Markets in the Department of Agriculture, along with a government-wide Conservation and Land Management Environmental Services Board to advise on incentives for ecosystem services. And last November, a meeting in Malaysia kicked off a United Nations-sponsored Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services patterned after the agency’s influential Intergovernmental Panel on Climate Change.

If such efforts are to succeed, however, and if ecosystem services are ever going to be successfully integrated into the regular economy, the scheme will have to be founded on even more hard science. Distributed sensing efforts such as the US National Science Foundation’s National Ecological Observatory Network will be invaluable in this regard. But science policy-makers will need to make ecosystem monitoring, research, analysis and simulation a high priority in general — and on an ongoing basis. Granted, it will be difficult to find money for such activities in the current economic downturn. But they could provide a fair number of jobs. Monitoring tasks such as checking sediment traps and nitrogen levels in streams require many boots on the ground, for example, and streambed restoration requires many more.

The downturn also highlights perhaps the most worrying consequence of putting prices on the services provided by nature: it will make everything more expensive. This is not a politically palatable move at any time, much less now. But the whole point of the ecosystem services approach is that it saves everyone money in the long run. The damage that Hurricane Katrina inflicted on Louisiana in 2005 was a dramatic example of how ecosystem services — in this case, storm-buffering wetlands — are often cheaper to maintain than they are to live without. As governments launch large infrastructure projects to stimulate their economies, they should fold ecosystem services into the budget analyses. Destroying many ecosystems for short-term economic benefit is like killing the cow for its meat, when one might keep from starving by drinking its milk for years to come. Now is not the time to slaughter the cow. ■

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